

## SOLVING MOTION PROBLEMS USING KINEMATIC EQUATIONS – PART DEUX

1. At the inaugural Olympic Games in 1896, Tom Burke of the USA set a world record in the 100 m men's sprint with a time of 12.0 seconds. On Sept. 9 of 2007, Jamaican Asafa Powell set the track on fire with a world record of 9.74 seconds. Assuming uniform acceleration throughout the entire race, determine the accelerations of both individuals.
2. You are travelling in your vehicle and suddenly you have the misfortune of experiencing a collision with another vehicle. If it takes 0.08 s for an air bag to stop you, what is the acceleration experienced by a person moving at 13 m/s and coming to a complete stop in that time frame?
3. What is the displacement experienced by a car accelerating from 15 m/s [fwd] to 10 m/s [fwd] in 8.0 s?
4. What was the initial velocity of an object that moved 120 m in 5.60 s, reaching a final velocity of 15.0 m/s in that time?
5. Jules Verne wrote a book called *Around the World in Eighty Days*. What would have been his average speed in m/s and km/h if the average radius of the Earth is 6400 km?
6. Steve, travelling at 40 km/h, accelerates at  $2.3 \text{ m/s}^2$  for 2.7 seconds. How far has he travelled in that time? What is his final velocity?
7. Another car is accelerating at a rate of  $-5.55 \text{ m/s}^2$ . How far does it travel if its original velocity is 50 km/h and its final velocity is 5 m/s?
8. A dragster accelerates from rest for a distance of 450 m at  $14 \text{ m/s}^2$ . A parachute is then used to slow it down to a stop.
  - a. What is the dragster's velocity just prior to the parachute opening?
  - b. If the parachute gives the dragster an acceleration of  $-7.0 \text{ m/s}^2$ , how far has the dragster travelled before stopping?
9. Donovan Bailey ran the 100 m race at the Atlanta Olympics in 9.84 s. What was his average velocity for this race?
10. A sneeze causes you to momentarily shut your eyes. If this process takes 0.5 seconds and you are travelling down the highway at 120 km/h, how far will you travel in that time? What must you assume in this question in order for you to be able to answer it?

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1.  $1.39 \text{ m/s}^2$ ,  $2.11 \text{ m/s}^2$
  2.  $-162.5 \text{ m/s}^2$
  3. 100 m
  4. 27.8 m/s
  5. 5.8 m/s, 20.9 km/h
  6. 38.4 m, 17.3 m/s
  7. 15.1 m
  8. 112.2 m/s, 900 m or a total of 1350 m
  9. 10.2 m/s
  10. 16.7 m/s